

DIMENSIONS OF QUALITY: CONSIDERATIONS IN THE CONTEXT OF CONSUMER GOODS

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Most studies on quality have examined it as an unidimensional concept. This paper stresses the importance of analyzing this key strategic variable as a consolidated, multidimensional construct. The authors propose a conceptual framework which identifies a set of contingency factors that determine which dimensions of quality assume greater strategic significance over others. The theoretical model also illustrates the need to regard quality as a dynamic ingredient of the strategic plan which places varying demands on managers depending upon the order of market entry of the strategic business unit and the stage of the product life cycle. A number of theoretical propositions are generated. An empirical test of the hypotheses is reported and the significance of the results for managerial considerations and future academic research is described.

INTRODUCTION

The management of the quality of products and services offered by an organization occupies a paramount position among business functions. Although product quality has long been regarded as a pivotal determinant of customer satisfaction and consequent business performance, during the last decade, that realization has permeated the business press (e.g., Byrne, 1994; Calomiris, 1991; Jacob, 1993; Port, 1991, 1992; Rose 1991) as well as academic journals (e.g., Aaker and Jacobson, 1994; Fornell, 1992; Shetty, 1987). Quality, as a topic of research, has enjoyed a rich tradition in economics, strategic management, production and operations management, and marketing. Studies have examined the relationship of quality with several other factors, including cost, price, advertising expenditure, and performance. While such studies provide a rich knowledge base, an overwhelmingly large proportion of these works have regarded the quality construct, implicitly or explicitly, as unidimensional. Concerns related to the structural or elemental aspects of the concept have been rarely addressed. The few research studies that discuss structural aspects of quality include Brucks and Zeithaml (1991), Garvin (1987) and Hjorth-Andersen (1984). These studies suggest that it is conceptually and methodologically more expedient to regard quality as a construct which incorporates

several distinct facets. One tacit assumption embodied in most prior research is that the connotation of quality remains unvarying within a particular industry. That is, it has generally been implied that firms within any particular industry either actually specify quality in a similar manner or, in the very least, *should* do so. In a later section of this paper, we propose that even for firms within a particular industry, different dimensions or facets of quality will tend to assume more (or less) importance depending upon several contingent factors.

The purpose of this paper is to examine the multidimensional nature of quality and propose a theoretical framework which describes the impact of the different dimensions of quality on business performance and the contingent nature of those influences. We begin with a discussion of the multidimensional nature of the quality construct and its importance in managerial considerations. Subsequently, an empirical test of the propositions derived from the theoretical framework is described and the results are presented. Finally, the implications of the study for the literature on quality and managerial planning are discussed.

QUALITY: A MULTI-DIMENSIONAL PERSPECTIVE

The abstract and intractable nature of the quality construct is widely acknowledged (e.g., Parasuraman *et al.*, 1985; Tellis and Fornell, 1988). In one of the earliest discourses on the multidimensional nature of quality, Hjorth-Andersen (1984) argues that, given the vista of the quality construct, studies incorporating an unidimensional view of quality are methodologically

flawed and advises against the adoption of such a procedure. Garvin (1984b, 1987) proposes that quality be viewed as a construct that embodies at least eight dimensions. He suggests that managers should focus on only a few of those dimensions in order to attempt to establish a quality-niche. He contends that a strategy incorporating a quality-niche is critical because it is likely to be very difficult, if not impossible, for businesses to compete on all eight quality dimensions. In addition, competition based on selected dimensions of quality is prone to be more efficient and profitable.

Given the breadth and elusive nature of the construct, it would seem reasonable to assume that practitioners will tend to define quality according to their own individual notions of the construct. Also, because perceptions of quality are susceptible to biases arising out of personal and ethnocentric proclivities, managers may engage in widely disparate activities in order to achieve quality-related goals. Faced with resource constraints and considerations of compatibility with core competencies, businesses may also deliberately choose to focus on a few selected facets of quality. Consistent with Garvin's (1987) recommendation, we contend that not only is it important to focus on a subset of quality dimensions, but also the actual choice of dimensions is critical from a strategic perspective. Our study emphasizes a view of quality that is closer to the managerial perspective than in most studies which measure quality based on consumer perceptions (e.g., Aaker and Jacobson, 1994; Chang and Wildt, 1994; Gotlieb and Sarel, 1992; Kelley and Davis, 1994). It is arguable that managerial perceptions of quality and consequent actions are closely tied to strategic business decisions concerning image and positioning of products as well as advertising and promotional themes that communicate the meaning of products to consumers. This would suggest that managerial perceptions of quality may determine, in part, consumers' perceptions of quality. Simultaneously, consumer expectations of quality from a whole class of products may influence the setting of the *de facto* standard of quality. In a sense, the market place can and does set quality standards that businesses must respond to. This bidirectional nature of causality of the relationship between the consumers' and managers' perceptions of quality is, however, only of peripheral importance to this study. In choosing to emphasize the managerial perspective, we define quality as an integrated construct that consists of a set of controllable attributes which may be operated upon to meet market objectives. Managers may manipulate or control this set of attributes in influencing the consumer perceptions and evaluations of products. In our scheme, these controllable attributes constitute the dimensions of

quality. The allocation of relative levels of emphasis to these different dimensions would make up a part of the firm's strategic plans.

Dimensions of Quality

Garvin (1987) views quality as a many-faceted idea that captures a rich melange of "traits" that can be found in products and services. The eight facets of quality proposed by him are summarized as follows. *Performance* refers to the primary operating characteristics of a product. Since the perceived importance of a particular performance factor will vary among individuals, any translation between performance rating and quality rating will be difficult and, at best, equivocal. That is, the relationship between quality and performance is predominantly contingent on individual perceptions. *Features* are secondary characteristics of the product. While features and performance characteristics are similar, the distinction lies in the centrality or degree of importance to the user. Like performance characteristics, the relationship between features and quality is dependent on individual evaluations. *Reliability* reflects the probability of the product's failure within a specified time period. Reliability is especially relevant to industrial and consumer durable goods because those product are used over a given period of time. *Conformance* is a quality dimension that is related to the manufacturing-based approach to quality. Analogous to the notion of tolerance in engineering, conformance deals with the degree to which a product matches pre-established standards. Unlike performance and features, conformance is an objective measure of quality. *Durability* is a measure of the life of the product or the time until the first occurrence of a breakdown. When a failed product can be repaired, durability is measured by repair costs, the value of time, and inconvenience. When repair is impossible, durability is defined as the amount of use provided before the product fails. *Serviceability* deals with speed, courtesy, and competence of repair. While speed and competence of repair can be measured objectively, it is likely that individual standards influence the evaluation of serviceability. *Aesthetics* alludes to how a product looks, feels, sounds, tastes, and smells. Evidently, this dimension is inherently subjective. *Perceived quality* is largely subjective as well. It is believed to be influenced by an assortment of cues and signals related to the product.

In a survey pertaining to characteristics of durable goods, Brucks and Zeithaml (1991) identified six abstract dimensions of quality: ease of use, functionality, performance, durability, serviceability, and prestige. *Ease of use* is the converse of the level of difficulty one

encounters in the use of a product. Often referred to as "user-friendliness" in sales and technical parlance, this is frequently an important concern in high-technology products, such as video equipment, computer hardware and software, for instance. *Functionality* is believed to be related to the "bells and whistles" that accompany a product. The three-way lumbar support offered in many contemporary luxury automobiles is an example of the functionality dimension. *Performance* refers to the ability of the product to deliver on its core function. The ability of an automobile to transport people from one point to another exemplifies this dimension. *Durability* is a measure of the actual, useful life of the product. *Serviceability* refers to the "ease," "responsiveness," and "reliability" of a service offered by the provider. A service center that is easily accessible to the customer and is staffed by friendly, competent workers would merit high ratings on this dimension. *Prestige* refers to the relative image which a product communicates to the intended customer group. It includes perceptions of quality, value, or sophistication associated with the product.

One view of the multi-dimensional nature of quality which would be especially relevant to strategic marketing is that which attempts to capture the perspective of practitioners. It is not hard to imagine that managers' assessments of the relative importance of quality dimensions and, more critically, their evaluation of their own product's performance on those dimensions are likely to be powerful determinants of their marketing efforts and consequent performance of the firm. Also, a scheme in which managers evaluate their own product on relevant quality dimensions (in terms of how it rates in comparison with competitors' products) would offer measures associated with a high level of expertise and

credibility. This measure of quality is found in the *Profit Impact of Market Share* (PIMS) data base of the Strategic Planning Institute. The quality measures included in this data base include managers' evaluations of their products on three quality categories: product-based, service-based, and image-based quality. The *product-related* category refers to durability, reliability, efficiency, and aesthetics; the *service-related* category refers to such issues as delivery, competence of the sales force, and technical assistance; and the *image-related* category refers to the influence of the brand name on consumer attitudes and purchase intentions. The PIMS formulation of quality is theoretically consistent with the models proposed in prior research and, in fact, expresses the multifaceted nature of quality in a more succinct and manageable form. The nature of correspondence between the PIMS formulation and those of Garvin (1984a) and Brucks and Zeithaml (1991) are shown in Table 1. Additionally, the PIMS formulation is particularly well-suited for empirical testing of theory and research propositions.

THEORETICAL RELATIONSHIPS AND PROPOSITIONAL INVENTORY

Several researchers (Buzzell and Gale 1987; Buzzell, Gale, and Sultan 1975; Gale and Buzzell 1989; Jacobson and Aaker 1987; Phillips, Chang, and Buzzell 1983; Rust, Zahorik, and Keiningham 1994; Schoeffler, Buzzell, and Heany 1974; Szymanski, Bharadwaj, and Varadarajan 1993) have found that product quality has a strong influence on a firm's market share and return on investment (ROI). In addition, Garvin (1984b, 1987) argues convincingly in favor of the notion that firms should choose quality niches to operate in. Given the significance of the structural aspects

TABLE 1
THREE SCHEMES FOR CATEGORIZING DIMENSIONS OF QUALITY

PIMS Quality Criteria	Garvin (1984)	Brucks and Zeithaml (1987)
Product-based dimension	Performance, Features, Conformance, Reliability,	Eas of Use, Functionality, Performance, and Durability and Durability
Service-based dimension	Serviceability	Serviceability
Image-based dimension	Aesthetics and Perceived Quality	Prestige

of quality, it seems important to develop a theoretical framework that identifies the contingent nature of the effect of emphasizing each of the dimensions of quality on the performance of the firm.

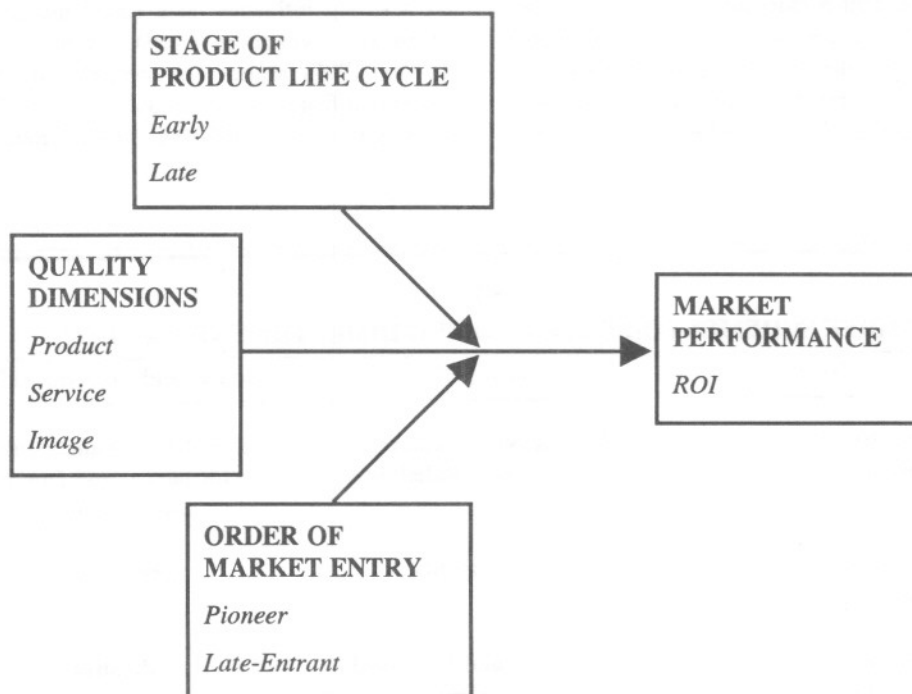
The theoretical model, as shown in Figure 1, identifies the three operational dimensions of the quality construct: product-based, service-based, and image-based. Additionally, two contingency factors, *order of market entry* and *stage of the product life cycle* are proposed to moderate the relationship between the emphasis on quality dimensions and the performance of the firm, measured by ROI. These two contingency factors influence the efficacy of the quality dimensions in their contribution toward overall performance objectives of the organization. We propose that optimal choices of quality dimensions are eventually reflected in the firm's performance, measured in terms of return on investment (ROI). This framework may be used to generate a number of theoretical propositions about the contingent relationship between emphasis on particular quality dimensions and performance. Rationale for the moderating impacts of the two contingency variables

and subsequent theoretical propositions are generated in the following sections.

Order of Market Entry

Order of entry in the market is a critical determinant of the success of a product (Crawford 1977; Hopkins and Bailey 1971; Lambkin 1988; Mitchell 1991) and contributes significantly to the how the product is perceived (Alpert and Kamins 1994; Urban et al. 1986). Market pioneers tend to enjoy stable preference patterns (Bain 1956) and consumers willingly continue to pay higher prices for established products than for those of newer entrants (Lane and Wiggins 1981). Schmalensee (1982) contends that high-quality pioneering brands tend to enjoy a fairly persistent advantage over later entrants. He argues that since consumers become familiar with the pioneering brand, they use its quality level as a benchmark for evaluating brands of subsequent entrants. Consequently, pioneering brands gain a competitive advantage. Robinson and Fornell (1985) found that for consumer goods, pioneering brands usually rank high on tangible measures of

FIGURE 1
CONTINGENT RELATIONSHIP BETWEEN
QUALITY DIMENSIONS AND PERFORMANCE



quality. Similar findings were reported by Robinson (1988) for industrial goods. Both studies arrived at their respective conclusions based on analyses of the PIMS data set. Pioneering SBUs often have the responsibility of defining the functionality and advantage of the product class to consumers. They are required to communicate in clear and precise terms *what the product does* and in what respect it is advantageous for consumers to choose the pioneer brands over existing alternatives.

- H1 The *product dimension* of quality has a greater impact on ROI for *pioneers* than it has for late entrants.

Abell and Hammond (1979) suggest that market pioneers benefit from early entry and provide a superior product at a price that is often lower than competitors' prices. Such superiority often translates into favorable image (Porter 1980). Alpert and Kamins (1994) explore the psychological literature for the behavioral origins of pioneer brand advantage. They suggest that a number of psychological processes and decision making factors are affected by consumers' interactions with products and brands offered by market pioneers. In particular, pioneering brands, under many circumstances, tend to be associated with the image and reputation of a leader. Consumers tend to integrate such product and brand images with their self-concepts and that, in turn, enhances the competitive advantage enjoyed by pioneers.

As with the tangible dimensions of quality, it is often incumbent upon pioneers to define the symbolic meaning associated with products. Through promotional communications, product configurations, and positioning strategy, they have the opportunity to *define* for the consumer the connotations of the product that are likely to last for a long time. Pioneering SBUs that take the strategic opportunity to participate in the forging of the image dimension of their product quality are more likely than not to reap long-term benefits.

- H2 The *image dimension* of quality has a greater impact on ROI for *pioneers* than it has for late entrants.

Kotler (1980) indicates that later entrants have one advantage in that they are able to evaluate the pioneer's products and respond accordingly. For them, new product technology (Porter 1980) and differentiated service (Prescott and Visscher 1977; Robinson 1988; Schmalensee 1982) are more accessible. Since they do not experience many of the expenses associated with

start-up costs, consumer education, and learning experiences, they are able to provide a more integrated range of support services. An emphasis on differentiated service, therefore, may be one of the most advisable courses of action that late entrants may have.

Alpert and Kamins (1994) also speculate that for non-pioneering brands, an emphasis on service may be the wisest strategy. They cite the classic Avis message ("tries harder") to communicate the point that follower brands that often have lower market shares and revenue than the pioneering brand may achieve congruity of brand image and consumer self-concept by emphasizing and demonstrating resolve for service, support, and customer orientation. It is, therefore, likely that later entrants will be more successful when they choose to emphasize service dimensions of quality than when they do not.

- H3 The *service dimension* of quality has a greater impact on ROI for *late entrants* than it has for pioneers.

Product Life Cycle

Typically, quality has been assumed to be a static construct in so far as the quality requirements in products have been considered to remain fixed over time. Research on issues related to the product life cycle, however, provides overwhelming evidence to the contrary.

The product life cycle (PLC) is a descriptive model of the stages of the market's acceptance of a product and has been used extensively as a framework for strategy formulation (e.g., Balachandran and Jain, 1972; Chambers *et al.*, 1971; Cooke and Edmondson, 1973; Kovac and Dague, 1972; Parsons, 1985) and to prescribe allocation of efforts and resources (e.g., Anderson and Zeithaml, 1984; Kotler, 1980; Thietart and Vivas, 1984). All of the preceding research is based on the theoretical premise that the market's perception and acceptance of a product undergo definitive changes through a number of sequential stages. These studies also provide normative rules of strategic action contingent upon the stage of the PLC. In accordance with the focal principle of the PLC model, the framework proposed in this research suggests that the firm's strategic responses to quality requirements should be dynamic as well. This position is consistent with a stream of research (Harrigan 1980; Tellis and Fornell 1988; Thietart and Vivas 1984; Thorelli and Burnett 1981) which attempts to investigate the interactive influence

of PLC stages and other key strategic factors on performance measures.

Thietart and Vivas (1984) studied 1,100 businesses in the PIMS data base and concluded that there exists a set of strategic decisions whose efficacy is contingent on the PLC stage. Tellis and Fornell (1988) used the PLC stages as proxy variables to study the relationship between advertising and product quality. Their study provide evidence that the markets, in general, are competitive when advertising is present and that an overall relationship between advertising and quality is more likely to exist during the latter stages of the PLC. Anderson and Zeithaml (1984) studied the differences in 25 strategic variables between stages of the product life cycle, and the differences among determinants of high performance across stages of the PLC. They analyzed data on 1,234 industrial products manufacturing businesses from the PIMS data base and found that strategy modifications between certain stages of the PLC are not only prevalent, but are beneficial as well. Their study provides support for the inclusion of PLC as an important contingency factor in strategy formulation.

The imperative to modify strategy between stages of the PLC (as demonstrated by the preceding studies) indicate the strong possibility that quality requirements will differ between stages of the PLC. In the early stage of the PLC, in the absence of a social image of a product, the utilitarian (or performance-based) benefits of a product or service are likely to outweigh other facets of quality. The literature on diffusion of innovations corroborates the importance of concrete product attributes for the acceptance of a new product in the market place. Product characteristics such as relative advantage, ease of use, trialability, and compatibility with existing product forms are believed to enhance consumer acceptance of innovative products (Rogers 1983). The newer the product (i.e., the earlier the product is in its life cycle), the more critical these tangible attribute aspects of the product are likely to be. This is also evident in advertisements for discontinuous innovations (i.e., radically new products). The clear communication of the performance-based features of the product is essential to create and sustain both primary and brand-specific demand. Advertisements for radial keratotomy are replete with diagrams and details of the surgical procedure. Similarly, advertisements for laser printers at the time of their introduction were characteristically rich in feature details. In contrast, consumers respond to advertisements and communication about products in the late stages of their life cycle (such as, wristwatches, to mention only one

from an universe of innumerable potential candidates) when service- and image-based factors are highlighted. Empirical and theoretical research corroborate the view that an emphasis on service and image dimensions help to maintain sales and "milk" the market in the later stages of the PLC (Abell and Hammond 1979; Day 1986; Kotler 1980).

H4 The *product dimension* of quality has a greater impact on ROI in the *early stages* of the PLC than it has in the later stages.

H5 The *service dimension* of quality has a greater impact on ROI in the *later stages* of the PLC than it has in the early stages.

H6 The *image dimension* of quality has a greater impact on ROI in the *later stages* of the PLC than it has in early stages.

METHOD

Overview of the Data Base

The preceding theoretical propositions were tested on data drawn from the PIMS data base. Widely regarded as "the most extensive strategic information data base in the world" (Peters and Austin 1985), the PIMS data base contains quantitative information pertaining to competitive strategy, market structure, and business performance on thousands of strategic business units. This data base has been used extensively to examine various issues by scholars of business strategy, economics, finance, and marketing. The data base has information on more than 2,900 strategic business units (SBUs) from more than 450 firms spanning the period from early 1970s to the mid-1980s.

The PIMS data base contains relevant cross-sectional data on a variety of strategic and performance variables that have been demonstrated to be valid and reliable (Capon, Farley, and Hulbert 1987; Jacobson and Aaker 1987; Marshall and Buzzell 1990). Also, the participants in the PIMS program are users of the data base as well. Thus, managers who provide the data are likely to be motivated to provide accurate information and spend considerable amounts of time acquiring it (Clarke and Grilliches 1983). Since the data base contains information regarding the operational results of the SBUs, it is possible to examine associations between firms' strategies and performance (Zeithaml 1980). Finally, numerous studies have examined the overall quality of the data in the PIMS data base (e.g., Anderson and Paine, 1978; Marshall and Buzzell,

1990; Phillips and Buzzell, 1982; Phillips *et al.*, 1983). They conclude that the data appears to be relatively stable and display high reliability across samples. The data collection procedures of PIMS researchers have been rated to be of very high quality and relatively devoid of clerical errors and inconsistencies that frequently contaminate much of the data used by individual researchers (Phillips, Chang, and Buzzell 1983).

Despite these advantages, the PIMS data base is also associated with a few shortcomings. The participating firms tend to be large diversified corporations and are, therefore, not representative of the population of all businesses. These firms are better managed and financed and tend to be more successful than a typical random sample of businesses (Buzzell 1981). In the PIMS data base, the business unit and the market in which the business participates are subjectively defined. Occasionally, this tends to overstate market share (Hamermesh, Anderson, and Harris 1978; Marshall 1987). Further, the use of a single objective (maximization of ROI) in most of the analyses may be overtly conservative and shortsighted (Lubatkin and Pitts 1983). Also, PIMS models may not be able to pick up variations due to the environmental factors since the research is based on data from only a few time periods. Consequently, most of the findings from analyses of PIMS data provide stronger evidence of association than of causality (Day 1986). However, in their defense of the use of the PIMS data base, Scherer (1980) and Scherer *et al.* (1987) assert that almost all other secondary sources of data share similar problems. They contend that such data bases continue to be used for not only analyses but managerial decision making as well. Ultimately, it would perhaps be most useful to heed Day's (1986) caution that while the PIMS data base serves as an useful aid in describing and explaining a firm's strategic behavior, it should not supplant careful analysis and informed judgement.

Sample

Specifically, a subset of the four-year averaged data, known as the SPI4 data base, was used. The sample ($n=766$) used in this study includes strategic business units (SBUs) in two product categories - consumer durables and consumer nondurables. Approximately 16% of the sample ($n=120$) had products in the early stages (introduction and growth) of the product life cycle (PLC), while about 84% of the SBUs ($n=646$) had products in the late stages of the product life cycle (PLC). Also, the sample was evenly divided between pioneers and later entrants.

ANALYSES AND RESULTS

The hypotheses developed were tested using general linear model (GLM) techniques, such as analysis of variance (ANOVA) and analysis of covariance (ANCOVA). The results from these analyses are presented in two sets (order of market entry and stage on the product life cycle). Data from the consumer durable and non-durable goods industries were analyzed separately for cross-comparison.

Order of Market Entry

For SBUs in the consumer durable and non-durable goods businesses, separate GLM analyses were conducted to examine the profitability impact of each of the three dimensions of quality for pioneers and non-pioneers. In order to examine hypothesis 1, which states that the *product dimension* of quality has a greater impact on ROI for pioneers than it has for late entrants, a GLM analysis was conducted with ROI as the dependent variable, and with *product dimension of quality*, *type of market entry*, and the interaction of these two as independent factors. In the case of consumer durables, it was observed that the overall model was significant ($F = 6.15, p < .001$). Additionally, the main effect of the product dimension of quality ($F = 14.79, p < .0001$) as well as the interaction between product dimension of quality and order of market entry ($F = 3.85, p < .05$) were significant. These results are summarized in Table 2. Table 3 presents results from the ANCOVA tests that were conducted to examine the differences in the slopes of the relationship between ROI and product quality for pioneers and non-pioneers. The results suggest that product quality impacts ROI differentially for pioneers and non-pioneers ($F = 8.40, p < .001$). When the analyses were conducted separately on pioneer and late entrant samples, it was found that product dimension of quality was significantly related to ROI for pioneers ($F = 11.80, p < .001$) and non-significantly for non-pioneers ($F = 2.53$). (See Table 4.)

For consumer non-durable goods, similar analyses produced comparable results. The overall model with ROI as the dependent variable and with product quality, order of market entry, and their interaction as independent variables (see Table 2) was highly significant ($F = 13.98, p < .0001$). The main effects of the order of market entry ($F = 20.06, p < .0001$) and the product dimension of quality ($F = 11.65, p < .001$) were significant as well. The interaction effect of the two independent variables appeared to be marginally significant ($F = 3.63, p < .0574$). As in the case of

TABLE 2

F VALUES FROM SIX GLM ANALYSES INCORPORATING A QUALITY DIMENSION VARIABLE AND ORDER OF MARKET ENTRY

	Quality dimension ¹		
	Product	Service	Image
<i>Consumer Durables:</i>			
Overall model	6.15**	1.38	6.67**
<i>Type III sums of squares:</i>			
Quality dimension ¹	14.79***	0.85	15.06***
Market entry	0.60	1.35	5.89 ⁺
Quality dimension x Market entry	3.85 ⁺	2.10	7.04*
<i>Consumer Non-durables:</i>			
Overall model	13.98***	9.14***	16.68***
<i>Type III sums of squares:</i>			
Quality dimension ¹	11.65**	1.98	12.83**
Market entry	20.06***	3.79	4.26 ⁺
Quality dimension x market entry	3.63	0.92	10.08*

1: Quality dimension refers to the particular dimension of quality chosen as one of independent variables in the GLM analysis. Each of the three quality dimensions were used in turn and the corresponding results appear in the three right hand columns.

⁺: $p < .05$

*: $p < .01$

** $p < .001$

***: $p < .0001$

TABLE 3

F VALUES FROM SIX ANCOVA MODELS INCORPORATING A QUALITY DIMENSION VARIABLE AND ORDER OF MARKET ENTRY

	Quality dimension ¹		
	Product	Service	Image
<i>Consumer Durables:</i>			
Overall model	6.15*	1.38	6.67*
<i>Type III sums of squares:</i>			
Quality dimension ¹ within Market entry	8.40*	1.29	9.18**
<i>Consumer Non-durables:</i>			
Overall model	13.98**	9.14**	16.68**
<i>Type III sums of squares:</i>			
Quality dimension ¹ within Market entry	8.33*	1.44	12.17**

1: Quality dimension refers to the particular dimension of quality chosen as one of independent variables in the GLM analysis. Each of the three quality dimensions were used in turn and the corresponding results appear in the three right hand columns.

*: $p < .001$

** $p < .0001$

TABLE 4
F VALUES FOR OVERALL MODELS FOR INDIVIDUAL GLM ANALYSES WITHIN
EACH LEVEL OF ORDER OF MARKET ENTRY

	Quality dimension		
	Product	Service	Image
<i>Consumer Durables:</i>			
Pioneers	11.80*	-	14.09*
Late entrants	2.53	-	1.18
<i>Consumer Non-durables:</i>			
Pioneers	14.70*	0.09	23.20**
Late entrants	1.12	3.14	0.08

*: $p < .001$

**.: $p < .0001$

consumer durables, once again results of an ANCOVA model demonstrated that the relationship between product dimension of quality and ROI is significantly different for pioneers and late entrants (Table 3). Specifically, the *product dimension-ROI* relationship is significantly positive in the pioneer sample ($F = 14.70$, $p < .001$), while it is insignificant ($F = 1.12$) in the late entrant sample (Table 4). Evidently, the results of the analyses support the hypothesis that product dimension of quality has a greater impact on ROI for pioneers than for non-pioneers.

In the second hypothesis, it is proposed that the *image dimension* of quality has a greater impact on ROI for pioneers than it has for late entrants. GLM analyses with image dimensions of quality revealed the following results. For consumer durable goods, the overall model (with ROI as the dependent variable and with image dimension of quality, order of market entry, and their interaction as independent variables) was significant ($F = 6.67$, $p < .001$). The main effects of the image dimension of quality ($F = 15.06$, $p < .0001$) and the order of market entry ($F = 5.89$, $p < .05$) and effect of the interaction term ($F = 7.04$, $p < .01$) were significant as well (see Table 2). Once again, the relationship between ROI and the image dimension of quality appeared to be significantly different for pioneers and late entrants ($F = 9.18$, $p < .001$ in Table 3). As before, it was evident that the image dimension of quality was significantly correlated with ROI for pioneers ($F = 14.09$, $p < .001$) but not for later entrants ($F = 1.18$ in Table 4). Analyses of the sample of non-durable consumer goods SBUs show the

exact same pattern of results. Clearly, there appears to be strong support for the notion that image dimension of quality has a greater impact on ROI for pioneers than it has for non-pioneers.

According to hypothesis 3, the *service dimension* of quality has a greater impact on ROI for late entrants than it has for pioneers. For consumer durables, the overall GLM model (with ROI as the dependent variable and with service dimension of quality, order of market entry, and their interactions as the independent variables) was found to be statistically non-significant ($F = 1.38$, $p < .2479$), suggesting that service dimensions of quality do not impact ROI differentially for pioneers and non-pioneers. Table 2 presents results from the GLM test of the overall model. Similar insignificant results were obtained when the ANCOVA test for the differences in slopes of the *service dimension-ROI* relationship for pioneers and late entrants.

For consumer non-durables, however, the overall model was significant ($F = 9.14$, $p < .0001$), but the main effects of service dimensions of quality, order of market entry, and the interaction of service dimensions with order of market entry were not (Table 2). No other significant effects were observed. In sum, no support was found for the third hypothesis.

Stage of the Product Life Cycle (PLC)

Our second group of analyses is an exact replica of the preceding set of analyses, except that the *stage of the product life cycle* replaces *order of market entry* as the

independent factor of substantive interest. Results of the relevant analyses are summarized in Tables 5 through 7.

According to hypothesis 4, the *product dimension* of quality should have a greater impact on ROI in the *early stages* of the PLC than in the *later stages*. To test this hypothesis, a GLM analyses with ROI as the dependent variable, and with *product dimension of quality*, *stage of the PLC*, and the interaction of product dimension of quality and the PLC stage as independent factors was conducted. For consumer durables, although the overall model was significant ($F = 4.69, p < .01$) and the product dimension of quality was significant ($F = 10.31, p < .01$), no other significant effects were observed. Table 5 presents the relevant findings of this test. Results from the ANCOVA procedure (Table 6) indicate that the slopes of the *product dimension-ROI* relationship are significantly different for the two stages of the PLC ($F = 6.80, p < .01$). Separate GLM analyses with ROI as the dependent variable and product dimension of quality as the only independent

variable (effectively, correlations between ROI and product dimension) done for each of the two stages of the PLC showed that product dimension of quality was significant only at the later stages of the PLC ($F = 9.58, p < .01$). These results are presented in Table 7. For consumer non-durable goods, a similar set of analyses was conducted. The overall model was significant ($F = 7.99, p < .0001$), but none of the independent variables in the model had significant F -values. The product dimension of quality and the interaction of product dimension and PLC stage have F -values approaching significance ($F = 3.12, p < .07$, and $F = 3.35, p < .06$, respectively, in Table 5). The solution for the overall model showed that only product dimension of quality had a significant parameter estimate. The interaction between stages of the PLC was found to approach significance ($F = 3.35; p < .067$, Table 5). The ANCOVA procedure, utilized to test the difference in slopes of the *product dimension-ROI* relationship for the two stages of the PLC, indicate that the slopes for the two stages of the PLC are significantly different ($F = 11.66, p < .0001$,

TABLE 5
F VALUES FROM SIX GLM ANALYSES INCORPORATING A QUALITY DIMENSION
VARIABLE AND STAGE OF PRODUCT LIFE CYCLE (PLC)

	Quality dimension ¹		
	Product	Service	Image
<i>Consumer Durables:</i>			
Overall model	4.69*	0.36	5.09*
<i>Type III sums of squares:</i>			
Quality dimension ¹	10.31*	0.52	12.82**
PLC	0.01	0.01	2.75
Quality dimension x PLC	0.39	0.06	2.84
<i>Consumer Non-durables:</i>			
Overall model	7.99***	1.75	10.60***
<i>Type III sums of squares:</i>			
Quality dimension ¹	3.12	1.39	1.20
PLC	0.91	0.06	5.46 ⁺
Quality dimension x PLC	3.35	0.16	6.94*

1: Quality dimension refers to the particular dimension of quality chosen as one of independent variables in the GLM analysis. Each of the three quality dimensions were used in turn and the corresponding results appear in the three right hand columns.

+ : $p < .05$

* : $p < .01$

** : $p < .001$

*** : $p < .0001$

Table 6). This finding was corroborated by results from the separate GLM analyses for each level of the stage of the PLC in which product quality was found to be significant at the later stages of the PLC ($F = 25.39$, $p < .0001$) but not at the early stages of the PLC (Table 7).

Hypothesis 5 states that the *service dimension* of quality has a greater impact on ROI in the *later stages* of the PLC than it has in the *early stages*. Results from the GLM analyses, presented in Table 5, indicate that the overall model is not significant ($F = 0.36$). Subsequent analyses using ANCOVA (Table 6) and separate GLM models for each level of the stage of the PLC utilizing service dimension of quality (Table 7) as the only independent variable yielded similar non-significant results for consumer durables as well as consumer non-durables. These results fail to support the notion that service dimensions of quality impacts ROI differentially at different stages of the PLC.

According to hypothesis 6, the *image dimension* of quality should have a greater impact on ROI in the *later stages* of the PLC than in the *early stages*. For consumer durables, the results from the GLM test of this model found the overall model to be significant ($F = 5.09$, $p < .01$, Table 5). Among the independent variables, image dimension of quality ($F = 12.82$,

$p < .001$) was found to be significant as well (Table 5). Results from the ANCOVA test (Table 6) suggest that the *image dimension-ROI* relationship is significantly different between the two levels of the *stage of the PLC* factor ($F = 7.4$, $p < .001$). Support for such a conclusion can be found in the results of the GLM tests using the image dimension of quality as the only independent variable in separate samples corresponding to early and late stages of the PLC (Table 7).

For consumer non-durable goods, the overall model ($F = 10.60$, $p < .0001$), the main effect of the PLC stage ($F = 5.46$, $p < .0199$) and the interaction term ($F = 6.94$, $p < .01$) had significant F -values (Table 5). The solution for the model indicates that all the variables in the model has positive parameter estimates. The ANCOVA procedure was utilized to test the differences in slopes of the *image dimension-ROI* relationship between the two levels of the PLC stage. The results, presented in Table 6, indicate that the two groups have different slopes ($F = 15.57$, $p < .0001$). Independent GLM models for each stage of the PLC, with image dimension as the only independent variable in the model, support these findings (Table 7). For consumer non-durables, the image dimension of quality was significant only at the later stages of the PLC ($F = 33.27$, $p < .0001$) but not at the early stages of the PLC ($F = 0.46$).

TABLE 6
F VALUES FROM SIX ANCOVA MODELS INCORPORATING A QUALITY DIMENSION VARIABLE AND STAGE OF PRODUCT LIFE CYCLE (PLC)

	Quality dimension ¹		
	Product	Service	Image
<i>Consumer Durables:</i>			
Overall model	4.69*	0.35	5.09*
<i>Type III sums of squares:</i>			
Quality dimension ¹ within PLC	6.80*	0.31	7.40**
<i>Consumer Non-durables:</i>			
Overall model	7.99***	1.75	10.60***
<i>Type III sums of squares:</i>			
Quality dimension ¹ within PLC	11.66***	2.32	15.57***

1: Quality dimension refers to the particular dimension of quality chosen as one of independent variables in the GLM analysis. Each of the three quality dimensions were used in turn and the corresponding results appear in the three right hand columns.

*: $p < .01$

**: $p < .001$

***: $p < .0001$

TABLE 7
F VALUES FOR OVERALL MODELS FOR INDIVIDUAL GLM ANALYSES WITHIN
EACH LEVEL OF STAGE OF PRODUCT LIFE CYCLE (PLC)

	Quality dimension		
	Product	Service	Image
<i>Consumer Durables:</i>			
Early	3.53	0.22	6.63
Late	9.58*	0.35	7.06*
<i>Consumer Non-durables:</i>			
Early	0.00	0.13	0.46
Late	25.39***	4.80 ⁺	33.27***

+ : $p < .05$

* : $p < .001$

** : $p < .0001$

IMPLICATIONS

The overall finding of this research is that considerations of the dimensions of quality are important for achieving profitability objectives and that their significance will vary depending upon the strategic characteristics of the firm and its products. In this study, the strategic variables considered were the firms' order of market entry and their products' stages in the life cycle. The findings of this study suggest that, for consumer goods, product and image dimensions of quality impact upon ROI for pioneers and non-pioneers differentially. Also, the influence of the quality dimensions on ROI is contingent upon the stage of the PLC.

Service Dimension of Quality

Somewhat surprisingly, the service dimension of quality does not appear to impact ROI differentially for pioneers and non-pioneers, or for early and later stages of the PLC. This is true for both consumer durable and non-durable products. One possible implication of this result could be that both pioneering and non-pioneering SBUs must be conscious and concerned with providing an acceptable level of service. ROI objectives may not be easy to achieve thorough quality niches that are based on the emphasis of the service dimension alone. It is also possible, however, that pioneers and non-pioneers are expected to provide different types of service. For example, pioneers introducing a new product might be expected to provide service in the areas of initial product usage, and applications. While non-pioneers

might be expected to provide service in the areas of product repairs and warranty for the "me-too" product.

Earlier studies in the area of service quality have looked at this issue from a model building perspective (Gronroos 1982; Parasuraman, Zeithaml, and Berry 1985) or from a scale development perspective (Parasuraman, Zeithaml, and Berry 1986). In addition to the fact that these were primarily detailed investigative forays into the nomological structure of the service quality construct, these studies also tended to emphasize the service sector of the economy. In contrast, this study examines service as one aspect of the component of the quality of *tangible* products - consumer durables and non-durables. Additionally, the contribution of the service dimension toward profitability of the product has not been empirically examined before. Viewed in this light, the significance of prior observed relationships between service quality and profitability are not entirely antithetical to the findings of this study. Further, our results only indicate that the service dimension of quality in the context of consumer durables and non-durables is no more important for pioneers than it is for late entrants and also that it is not contingent on the stage of the PLC. This finding does not strictly conflict with the conclusions of earlier researchers regarding the importance of service *at all times* (Parasuraman, Zeithaml, and Berry 1985). While the specific types of service may vary overall, service as a dimension of quality perhaps might not be discriminated between the stages of the PLC. It is possible that marketers will be required to evaluate their service

function and maintain a minimum service level in order to attain profitability objectives. Prior studies have argued in favor of the importance of service quality mostly from a purely conceptual standpoints. This study offers a preliminary empirical test of some of the earlier arguments for superior service quality.

Image Dimension of Quality

The image dimension of quality appears to impact pioneers and non-pioneers differently. The results of this study indicate that it impacts ROI more significantly for pioneers of consumer goods. The brand name or the company name appear to influence the success of pioneering consumer goods. Therefore, developing and securing a high image for the brand or company should become a priority for pioneers of consumer goods. These observations are consistent with the conclusions of Enis and Stafford (1969). They found that store image acts as a quality cue. The impact of brand name, in general, on perception on quality was discussed in an earlier study by Jacoby, Olson, and Haddock (1971). Though earlier studies have found brand name and store image often influence perceptions of quality, there have been no attempt to examine its impact on profitability objectives. Porter (1980) suggests that the image of pioneership can be of much help in the course of market share battles. The image of pioneership, Porter explains, rests in technological sophistication signified by the product introduction. Urban et al. (1986) found a strong relationship between order of market entry and market share. The authors conclude that using advertising to increase and maintain image will help pioneers over non pioneers in market share battles. Once again, no attempt was made in prior research to empirically examine the significance of image in achieving ROI objectives. Nor, for that matter, has there been any prior endeavor toward examining the differential impact of image on ROI objectives for pioneers and non pioneers. The present study is the first such attempt.

Product Dimension of Quality

The results from this study indicate that product characteristics such as the performance, features, reliability

and durability appear to be more critical for pioneering SBUs of consumer goods. Since new consumer products, in general, tend to be upgrades from the existing alternatives the importance of product characteristics seem natural and is supported in this study. Pioneers of these new products should therefore, critically examine the product characteristics and compete based on these dimensions. Although this result is consistent with that observed in several earlier studies (Crosby 1979; Fine 1986; Jacobson and Aaker 1987; Phillips, Chang, and Buzzell 1983), none of these earlier studies attempted to isolate image and service components from the overall product quality evaluation. In general, product quality has been defined usually as the difference between percent of attributes rated superior and percent of attributes rated inferior. These dimensions or attributes were not separated along tangible and intangible factors. Such a separation is necessary in order to determine what aspect of the product is significant for achieving profitability objectives. Also, other than Thietart and Vivas (1984), no study on product quality attempts to examine the differential impact product quality has on profitability based on the types of firms and product categories. Understanding how individual dimensions of quality impacts profitability under variety of strategic environments will help in determining positioning strategies and also in product mix determinations.

The findings related to the influence of the product dimension of quality on the profitability for both consumer durables and non-durables are unexpected and contrary to intuitive wisdom. Product dimensions of quality appear to be important in the later stages of the PLC than they are at the early stages. In hindsight, this phenomenon may be attributed, in part, to some degree of tolerance on part of the consumers toward lesser product quality in the early stages of the PLC, since stable definitions of product quality may not emerge in the market as a whole. In the case of mature products, consumers may have well-defined and developed tastes and demands with regard to product characteristics. In such cases, product dimensions of quality are likely to be more critical. Admittedly, the results of the differential nature of impact of the product dimensions of quality on performance are somewhat enigmatic.

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